

UNIT 5 & 6: Trigonometry

Objectives: Upon completion of the unit, students will be able to:

- Convert angles from degrees to radians and vice versa
- Find coterminal angles and use those angles in the unit circle
- Locate and draw reference triangles, using the angle in standard position
- Solve a right triangle (find all 3 sides and all 3 angles)
- Determine the trig functions of a particular angle using the unit circle
- Find exact values of trig functions of the reference triangles of multiples of $\pi/6$, $\pi/4$ or $\pi/3$ (finding terminal point)
- Solve applications involving right triangles
- Use symmetry about the unit circle to find exact trig values
- Graph all 6 trig functions on the coordinate plane (and identify zeros, asymptotes, etc.)
- Write trigonometric functions based on application information (ferris wheel type, harmonic motion, etc.)
- Use Law of Sines and Law of Cosines to solve non-right triangles and their applications
- Use inverse trig to evaluate expressions

Video Lectures	Video Examples	Section from Text (WebAssign)
1a. Types of Angles - Animation 1b. Radian Angles 1c. Angles in Standard Position 1d. Arc Length and Area of Sector	1a. Convert angles from degrees to radians 1b. Convert angles from radians to degrees 1c. Find positive and negative coterminal angle 1d. Animation of Angles in Standard Position 1e. Determine if two angles are coterminal	6.1
2a. Finding trig functions using right triangles 2b. Given trig value and quadrant, find all other trig values	2a. Find 6 trig functions given right triangle 2b. Which trig function should I use? 2c. Determine trig function value given right triangle	6.2 (part I)
3a. Congruent and Similar Triangles 3b. Special Right Triangles 3c. Determining coordinates based on reference angles (triangles) in each quadrant 3d. Determine the value of each expression using the unit circle 3e. Understanding Symmetry about unit circle (same trig values)	3a. Determine Reference Angles 3b. Determine quadrant of terminal side of angle 3c. Find exact trig values using coterminal reference angles 3d. Find sine and cosine values using reference triangles ($\pi/6$ and $\pi/3$ multiples) 3e. Find sine and cosine values using reference triangles ($\pi/4$ multiples) 3f. Determining basic trig functions (0's and 1's) using the unit circle	5.1, 5.2
4a. Trig Functions using right triangles (repeat of 2a) 4b. **Solving Applications using right triangles 4b. **Application of right triangles (ladder)	4a. Find 6 trig functions given right triangle (repeat of 2a) 4b. Which trig function should I use? (repeat of 2b) 4c. Determine trig function value given right triangle (repeat of 2c) 4d. ** Given terminal point, find six trig functions	6.2
5a. Unit Circle (again)	5a. Find cosine and sine using reference triangles (degrees)	6.3

5b. Determine 6 trig values given quadrant and one other trig value	5b. Find trig function values on unit circle (negative big angle) 5c. Determine angles with the same trig value (understand symmetry on unit circle)	
6a. Law of Sines 6b. The ambiguous case of Law of Sines	6a. Solve a triangle using the Law of Sines (given two sides and an angle) 6b. Solve a triangle using the Law of Sines (given two angles and a side) 6c. Application of Law of Sines	6.5
7a. Law of Cosines 7b. Law of Cosines - Application	7a. Law of Cosines - Application (width of lake) 7b. Law of Cosines - Application (airplane) 7c. Find an angle using Law of Cosines	6.6
8a. Graphing sine and cosine 8b. Animation – graphing the sine function 8c. Animation – graphing cosine function 8d. Graphing sine and cosine with various transformations 8e. Determining equation from graph of cosine or sine function	8a. Amplitude and Period of sine and cosine graphs 8b. Transformations of sine and cosine graphs 8c. Example graph with transformations 8d. Example on graphing with transformations 8e. Find the equation of sine or cosine given graph	5.3
9a. Graph the tangent function 9b. Animation – graph of tangent function 9c. Graph secant and cosecant functions 9d. Domain of secant and cosecant functions 9e. Graph cotangent function	9a. Graph tangent function using reciprocal functions and unit circle 9b. Graph secant using reciprocal function 9c. Graph a transformation of cotangent function	5.4
10a. Introduction to Inverse Trig Functions (to solve right triangles) 10b. GOOD Animation – Inverse Trig functions and their domains 10c. The basics on the graphs of inverse trig functions 10d. Evaluate expressions involving inverse trig functions 10e. Evaluate expressions involving inverse reciprocal trig functions (csc, cot, etc.)	10a. Evaluate inverse trig expression (part I) 10b. Evaluate inverse trig expression (part II) 10c. Evaluate inverse trig expression (part III) 10d. Evaluate expressions using trig and inverse trig (part I) 10e. Evaluate more expressions using trig and inverse trig (part II) 10f. Non special triangle example – any right triangle inverse trig	5.5, 6.4

11a. [Ferris wheel problem](#)

11a. [Simple Harmonic Motion of a Spring](#)

5.6